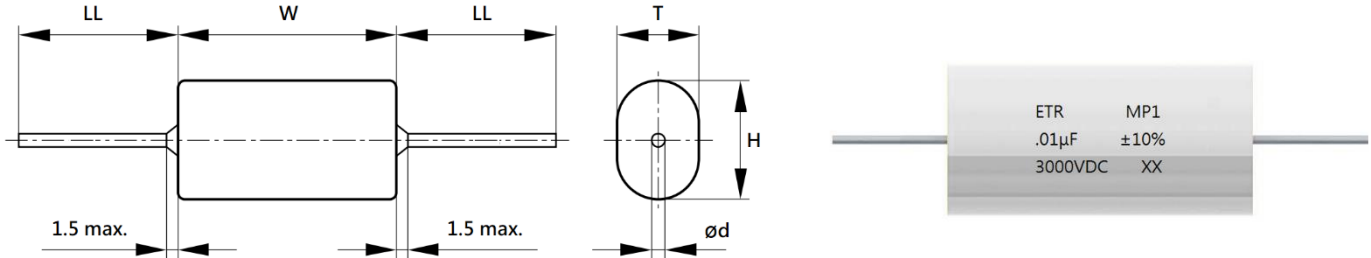


PMP1 series

■ Outline Drawing



■ Typical Applications

Snubber capacitor for energy conversion and control in Power semiconductor circuits, protection circuits in SMPS, induction heaters, high voltage, high current and High pulse applications

■ Features

Extended double metallised polyester electrodes with metallised polypropylene dielectric internal series connection
UL 510 polyester tape wrapping, UL 94 V-0 resin end fill

■ Construction



■ Specifications

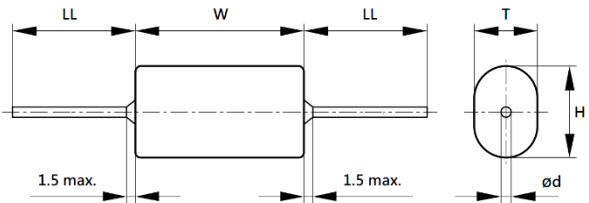
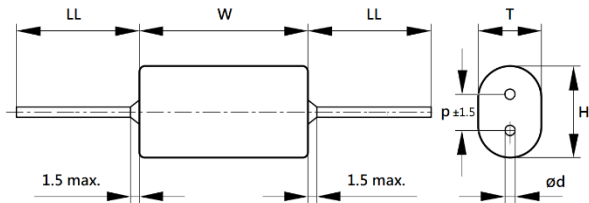
Reference Standard	GB/T 17702 (IEC 61071)			
Climatic Category	40/105/56			
Maximum permissible case temperature (T_{case})	-40°C ~ +105°C			
	+85°C to +105°C : decreasing factor 2.5% per °C for U_N			
Capacitance Range	0.01µF ~ 4.7µF			
Capacitance Tolerance	±5%(J) 、 ±10%(K)			
Rated (DC) Voltage	600Vdc	700Vdc	850Vdc	1000Vdc
	1200Vdc	1600Vdc	2000Vdc	3000Vdc
Voltage Proof (Between terminals V_{TT})	1.5 x U_{NDC} for 10 seconds			
Dissipation Factor	$C_N \leq 1.0\mu F$, DF 0.05% max.	1kHz, 1Vrms Max. at 25°C		
	$C_N > 1.0\mu F$, DF 0.06% max.			
Insulation Resistance	$C_N \leq 0.33\mu F$, IR $\geq 100,000M\Omega$	25°C, 100Vdc, 60 seconds		
	$C_N > 0.33\mu F$, IR x $C_N \geq 30,000s$			

PMP1 series

Product code system

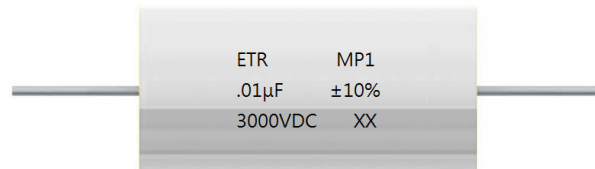
PMP1	X	103	K	3000	D	2	34	41
Type	Internal use	Capacitance	Tolerance	Rated Voltage	Voltage	Lead Forming	Capacitor Width	Lead Length
PMP1= IGBT Snubber Capacitors (Axial-Flat)	--	103 =10nF =0.01μF	J=±5% K=±10%	0600=600V 0850=850V 1000=1000V 1200=1200V 2000=2000V 3000=3000V	D=DC A=AC	2=2 pins 4=4 pins: P=10mm 5=4 pins: P=12.7mm Shown as Table I	34=34mm 46=46mm 54=54mm	41=41mm

Table I

Code	2 (2 Pins)	4 or 5 (4 Pins)
Lead Forming		

Mark

Marking



1. Manufacturer's Trademark: WINDAY or ETR	2. MP1: Type Construction
3. Capacitance: 0.01μF	4. Capacitors Tolerance: ±10%
5. Rated Voltage: 3000VDC	6. Date Code: XX

PMP1 series

■ Dimensions (mm)

600Vdc/700Vdc (275Vac)										
Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS}	ESR	Part number
						(V/us)	(A)	@100kHz (A)	@100kHz (mΩ)	
0.10	34	12	5.5	2	0.8	196	20	2.8	28	PMP1X104+0600D23441
0.15	34	13	6.8	2	0.8	196	29	4.4	13	PMP1X154+0600D23441
0.22	34	14	8	2	0.8	196	43	4.9	12	PMP1X224+0600D23441
0.33	34	16	9.5	2	0.8	196	65	6.1	9	PMP1X334+0600D23441
0.47	34	18	11.5	2	0.8	196	92	7.6	7	PMP1X474+0600D23441
0.68	34	20	14	2	1.0	196	133	8.9	6	PMP1X684+0600D23441
1.0	34	23.5	17	2	1.0	196	196	9.9	6	PMP1X105+0600D23441
1.5	34	27.5	21	2	1.2	196	294	12.1	5	PMP1X155+0600D23441
2.0	46	27.5	18	2	1.2	128	256	13.1	5	PMP1X205+0600D24641
3.3	54	31.5	22.5	2	1.2	105	346	17.3	4	PMP1X335+0600D25441
4.7	54	33	28.5	2	1.2	105	493	18.7	4	PMP1X475+0600D25441

850Vdc (450Vac)										
Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS}	ESR	Part number
						(V/us)	(A)	@100kHz (A)	@100kHz (mΩ)	
0.15	34	16	9.5	2	0.8	713	107	6.4	8	PMP1X154+0850D23441
0.22	34	18	11.5	2	0.8	713	157	7.0	8	PMP1X224+0850D23441
0.33	34	20.5	14	2	1.0	713	235	8.3	7	PMP1X334+0850D23441
0.47	34	23	17	2	1.0	713	335	10	5	PMP1X474+0850D23441
0.68	34	27	20.5	2	1.2	713	485	13.3	4	PMP1X684+0850D23441
1.0	46	26.5	17	2	1.2	400	400	12.7	5	PMP1X105+0850D24641
1.5	46	31	21.5	2	1.2	400	600	15.8	4	PMP1X155+0850D24641
2.0	46	34.5	25	2	1.2	400	800	19.8	3	PMP1X205+0850D24641
2.2	46	36	26.5	2	1.2	400	880	20.4	3	PMP1X225+0850D24641
2.5	46	37.5	28	2	1.2	400	1000	21.2	3	PMP1X255+0850D24641

PMP1 series

■ Dimensions (mm)

1000Vdc (500Vac)

Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS} @100kHz	ESR @100kHz	Part number
						(V/us)	(A)	(A)	(mΩ)	
0.15	34	17.5	11	2	0.8	856	128	7.4	7	PMP1X154+1000D23441
0.22	34	20	13.5	2	1.0	856	188	8.1	7	PMP1X224+1000D23441
0.33	34	23	16.5	2	1.0	856	282	9.7	6	PMP1X334+1000D23441
0.47	34	26	20	2	1.2	856	402	11.7	5	PMP1X474+1000D23441
0.68	34	30.5	24	2	1.2	856	582	13	5	PMP1X684+1000D23441
1.0	46	29.5	20.5	2	1.2	480	480	13.8	5	PMP1X105+1000D24641
1.5	46	34.5	25	2	1.2	480	720	17.3	4	PMP1X155+1000D24641
2.0	46	39	29.5	2	1.2	480	960	21.7	3	PMP1X205+1000D24641

1200Vdc (500Vac)

Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS} @100kHz	ESR @100kHz	Part number
						(V/us)	(A)	(A)	(mΩ)	
0.10	34	18	11.5	2	0.8	1142	114	6.7	9	PMP1X104+1200D23441
0.15	34	20.5	14	2	1.0	1142	171	8.3	7	PMP1X154+1200D23441
0.22	34	23.5	17.5	2	1.0	1142	251	9.2	7	PMP1X224+1200D23441
0.33	46	24	14.5	2	1.0	640	211	10	7	PMP1X334+1200D24641
0.47	46	27	17.5	2	1.0	640	301	10.9	7	PMP1X474+1200D24641
0.68	46	31	21.5	2	1.2	640	435	13	6	PMP1X684+1200D24641
1.0	46	36	26.5	2	1.2	640	640	15.9	5	PMP1X105+1200D24641
1.5	54	40	27.5	2	1.2	502	753	19.7	4	PMP1X155+1200D25441

PMP1 series

■ Dimensions (mm)

1600Vdc (630Vac)

Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS} @100kHz	ESR @100kHz	Part number
						(V/us)	(A)	(A)	(mΩ)	
0.10	34	20.5	14	2	1.0	1427	143	8.3	7	PMP1X104+1600D23441
0.15	34	24	17.5	2	1.0	1427	214	11	5	PMP1X154+1600D23441
0.22	34	27.5	21.5	2	1.2	1427	314	10.3	7	PMP1X224+1600D23441
0.33	46	27.5	18	2	1.2	800	264	11	7	PMP1X334+1600D24641
0.47	46	31	22	2	1.2	800	376	13.1	6	PMP1X474+1600D24641
0.68	46	36	27	2	1.2	800	544	14.5	6	PMP1X684+1600D24641
1.0	46	42.5	33	2	1.2	800	800	17.9	5	PMP1X105+1600D24641
1.5	54	47	34.5	2	1.2	628	942	22.2	4	PMP1X155+1600D25441

2000Vdc (630Vac)

Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS} @100kHz	ESR @100kHz	Part number
						(V/us)	(A)	(A)	(mΩ)	
0.022	34	14	8	2	0.8	1712	38	2.8	35	PMP1X223+2000D23441
0.033	34	16	9.5	2	0.8	1712	56	4.1	20	PMP1X333+2000D23441
0.047	34	17.5	11.5	2	0.8	1712	80	5.7	12	PMP1X473+2000D23441
0.068	34	20	14	2	1.0	1712	116	6.7	7	PMP1X683+2000D23441
0.10	34	23	17	2	1.0	1712	171	9.1	7	PMP1X104+2000D23441
0.15	46	23.5	14	2	1.0	960	144	9.8	8	PMP1X154+2000D24641
0.22	46	26.5	17	2	1.0	960	211	10.1	8	PMP1X224+2000D24641
0.33	46	31	21.5	2	1.2	960	317	11.3	8	PMP1X334+2000D24641
0.47	46	35.5	26	2	1.2	960	451	14.4	6	PMP1X474+2000D24641
0.56	54	36.5	24	2	1.2	754	422	13.9	7	PMP1X564+2000D25441
0.68	54	39	26.5	2	1.2	754	513	15.8	6	PMP1X684+2000D25441
1.0	54	45.5	33	2	1.2	754	754	19.4	5	PMP1X105+2000D25441

PMP1 series

■ Dimensions (mm)

3000Vdc (750Vac)										
Cap. μF	W _{Max.}	H _{Max.}	T _{Max.}	Pins	d _{±0.05}	dV/dt	I _{PEAK}	I _{RMS} @100kHz	ESR @100kHz	Part number
						(V/us)	(A)	(A)	(mΩ)	
0.010	34	14.1	7.8	2	0.8	2568	26	2.2	60	PMP1X103+3000D23441
0.015	34	15.5	9.5	2	0.8	2568	39	2.9	40	PMP1X153+3000D23441
0.022	34	17.5	11.5	2	0.8	2568	56	4	25	PMP1X223+3000D23441
0.033	34	20	14	2	1.0	2568	85	5.8	14	PMP1X333+3000D23441
0.047	46	20.5	11	2	1.0	1440	68	6.3	14	PMP1X473+3000D24641
0.068	46	23	13.5	2	1.0	1440	98	7.4	12	PMP1X683+3000D24641
0.10	46	26.5	17	2	1.0	1440	144	9	10	PMP1X104+3000D24641
0.15	46	30.5	21	2	1.2	1440	216	11.2	8	PMP1X154+3000D24641

Remarks:

- (1) The symbol + means capacitance tolerance: J=±5%, K=±10%
- (2) Rated voltage pulse slope (dV/dt) at voltage U_{NDC}
- (3) Maximum RMS current at 100 kHz, θ_{amb}=70 °C (cooling-air temperature), Δθ_{case}=15°C (container temperature rise)
- (4) Tinned wires - standard lead wire length 41mm (Min.)
- (5) If the condition does not meet, we can design customer-specific customization

PMP1 series

■ Specifications (GB/T 17702)

試驗項目 Test items	性能要求 Performance requirements	試驗條件 Conditions of test
電容量 Capacitance	在規定公差內 Within the tolerance specified	1kHz, 1Vrms Max. at 25°C
損耗因素 Dissipation Factor	$C_N \leq 1.0\mu\text{F}$, DF 0.05% max. $C_N > 1.0\mu\text{F}$, DF 0.06% max.	1kHz, 1Vrms Max. at 25°C
耐電壓 Voltage proof	應無異常 Shall be no abnormality	引線間 Between terminals V_{TT} $1.5 \times U_{NDC}$ for 10 seconds
絕緣電阻 Insulation resistance	$C_N \leq 0.33\mu\text{F}$, IR $\geq 100,000\text{M}\Omega$ $C_N > 0.33\mu\text{F}$, IR $\times C_N \geq 30,000$ seconds	25°C, 100Vdc, 60 seconds
引出端強度試驗 Robustness of terminations	無斷線，電容器無損壞 No wire breakage and no damage of capacitor	Tensile U_{a1} (Duration : 10s±1s)
		Wire diameter Section Load
		d ≤ 0.8mm S ≤ 0.5mm ² 10N (±10%)
		d ≤ 1.25mm S ≤ 1.2mm ² 20N (±10%)
		Bending U_b (4*90°, duration : 2s/bend)
		Wire diameter Section modulus Load
d ≤ 0.8mm $Z_x \leq 0.05\text{mm}^3$ 5N (±10%)		
d ≤ 1.25mm $Z_x \leq 0.019\text{mm}^3$ 10N (±10%)		
耐焊接熱 Resistance to soldering heat	(1) Appearance, No visible damage (2) $\Delta C/C : \leq 0.5\%$ of the initial value (3) DF (tanδ) : ≤ 0.005 of increased value	焊接溫度 Solder temperature: 260±5°C 焊接時間 Solder time: 10±1seconds
振動 Vibration	(1) Visual examination, No visible damage (2) $\Delta C/C : \leq 0.5\%$ of the initial value (3) DF (tanδ) : ≤ 0.005 of increased value (4) IR $\geq 50\%$ of specified values	10 Hz to 55 Hz ; a=±0.35 mm or acceleration 98 m/s ² Test duration: 10 frequency cycles (3 axes offset from each other by 90°) 1 octave/min
衝擊 Shock or impact		Pulse shape: half sine Acceleration: 490 m/s ² Duration of pulse: 11 ms

PMP1 series

■ Specifications (GB/T 17702)

試驗項目 Test items	性能要求 Performance requirements	試驗條件 Conditions of test
端子間直流電壓試驗 DC voltage test between terminals	(1) $\Delta C/C : \leq 0.5\%$ of the initial value (2) $DF (\tan\delta) : \leq 0.005$ of increased value (3) $IR \geq 50\%$ of specified values	$1.5 \times U_{NDC}$ at T_{amb} Duration: 10 s
衝擊放電試驗 Surge discharge test	(1) $\Delta C/C : \leq 1.0\%$ of the initial value (2) $DF (\tan\delta) : \leq 1.2 \times \text{initial } \tan\delta + 0.0001$	$1.1 \times U_{NDC}$ Number of discharges: 5 Time lapse: every 2 min (10 min total) Within 5 min after the surge discharge test Duration: 10 s $1.5 \times U_{NDC}$ at T_{amb}
自愈性試驗 Self-healing test	(1) $\Delta C/C : \leq 0.5\%$ of the initial value (2) $DF (\tan\delta) : \leq 1.1 \times \text{initial } \tan\delta + 0.0001$	$1.5 \times U_{NDC}$, duration: 10 s Increase the voltage at 100 V/s till 5 clearings occur or until voltage reach max. of $2.5 \times U_{NDC}$ for a duration of 10 s
溫度變化 Change of temperature	(1) $\Delta C/C : \leq 2.0\%$ of the initial value (2) Increase of $\tan\delta \leq 0.0150$	Test Nb $T_{max.} = +105^{\circ}C$ $T_{min.} = -40^{\circ}C$ Transition time: 1 h, equivalent to $1^{\circ}C/\text{min.}$ 5 cycles
恒定濕熱試驗 Damp heat steady state	(1) $\Delta C/C : \leq 2.0\%$ of the initial value (2) Increase of $\tan\delta \leq 0.0150$	$T = 40^{\circ}C \pm 2^{\circ}C$ $RH = 93\% \pm 3\%$ Duration: 56 days $1.5 \times U_{NDC}$ at ambient temperature Duration: 10 s
熱穩定性試驗 Thermal stability test under overload conditions	(1) $\Delta C/C : \leq 2.0\%$ of the initial value (2) Increase of $\tan\delta \leq 0.0150$ Temperature rise $< 1^{\circ}C$	Natural cooling $T_{amb} \pm 5^{\circ}C$ $1.21 \times P_{max.} = 1.21 \times (I_{RMS}^2 / w \times C) \times \tan\delta (f)$ with $w = 2 \times \pi \times f$ For I_{RMS} see specific reference data $f = 10 \text{ kHz}$ Duration: 48 h Measure the temperature every 1.5 h during the last 6 h
諧振頻率測量 Resonance frequency measurement	> 0.9 times the value as specified in typical curve "Resonant frequency" of this specification	Impedance analyzer at T_{amb}
端子間的耐久性試驗 Endurance test between terminals	(1) $\Delta C/C : \leq 3.0\%$ of the initial value (2) Increase of $\tan\delta \leq 0.0150$	Sequence: $1.25 \times (U_{RMS} \text{ at } 85^{\circ}C)$ at $T_{max.} = 85^{\circ}C$ Duration: 500 h 1000 x discharge at $1.4 \times \hat{I}$ (maximum peak current) $1.25 \times (U_{RMS} \text{ at } 85^{\circ}C)$ at $T_{max.} = 85^{\circ}C$ Duration: 500 h

PMP1 series

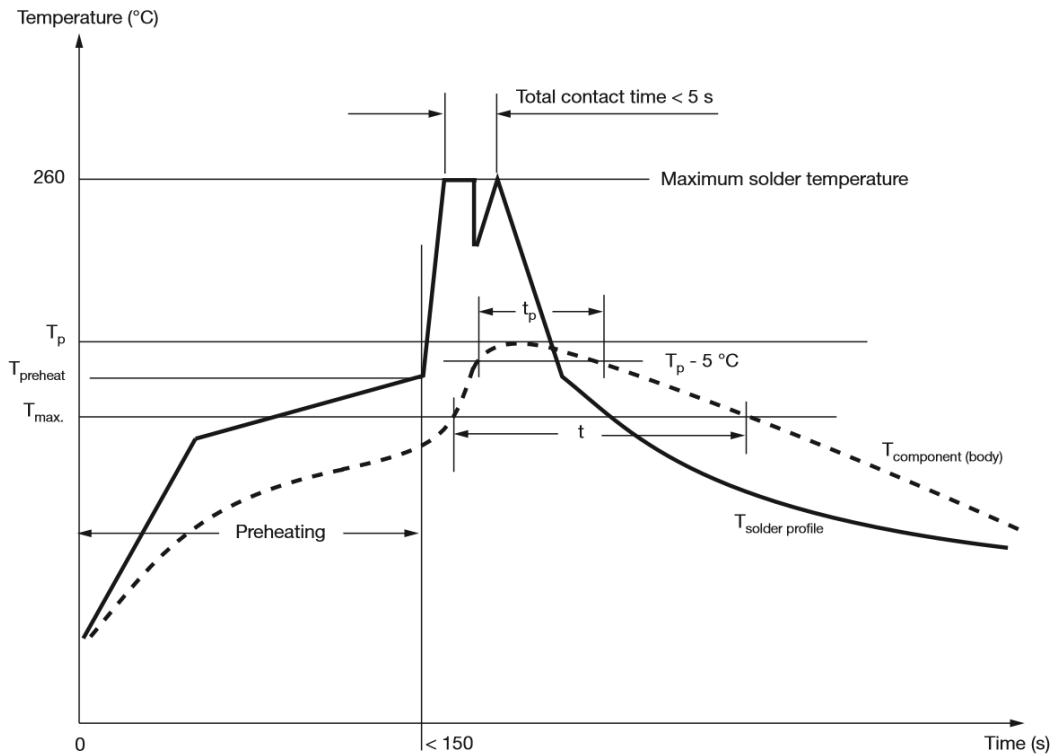
■ Soldering Guidelines for Film Capacitors

WDC recommends that users observe the following guidelines for soldering our film capacitors. Adherence to these recommendations will help to safeguard product specifications and reliability while preventing damage to the capacitors during soldering.

SOLDERING GUIDELINES AND RECOMMENDED WAVE SOLDERING PROFILE

With regard to the resistance to soldering heat and the solderability, our products comply with "IEC 60384-1" and the additional type specifications. The recommended wave soldering profile for our leaded components is defined as follows:

■ Wave Soldering Recommendations



T_p : Peak temperature of the component body (top)

T_{max} : Maximum application temperature of the component

The PSL (Process Sensitivity Level) is classified according JEDEC standard J-STD-075 "Classification of Non-IC Electronic Components for Assembly Processes" and summarized in following tables per product family and pitch size of the component:

SERIES	PRODUCT LENGTH OF CAPACITOR				
	34 mm	46 mm	54 mm	--	--
PMP1	(1),(3)	(1),(3)	(1),(3)	--	(--

(1) No risk

(2) Risk for parameter change if PSL is not strictly followed

(3) The component has a preheat limitation of 150 °C

(4) Temperature is measured at the body top and must be kept as follows:

During preheating: $T_{max.} \leq 125^\circ C$

During soldering: $T_p \leq 135^\circ C$, $t_p \leq 30\ s$, $t \leq 50\ s$

PMP1 series

■ Storage conditions and duration

Packaged capacitors should be kept in clean, ventilated, dry coffers, not near the heat source, not subject to direct sunlight, is strictly prohibited and chemical reagents, acid and harmful gas storage together.

$T_{stg} = +5^{\circ}\text{C}$ to $+35^{\circ}\text{C}$ with relative humidity of maximum 75% without condensation, storage for one year.

包裝好的電容器應存放在清潔、通風、乾燥的庫房內，不靠近熱源，不受陽光直射，嚴禁與化學試劑、酸和有害氣體一起儲存。 $T_{stg} = +5^{\circ}\text{C}$ 至 $+35^{\circ}\text{C}$ ，最大相對濕度為 75%，無冷凝，儲存一年。